TEXAS INSTRUMENTS

11 March 2002

Via Electronic Filing
Mr. William F. Caton
Acting Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: ET Docket 01-278 * Reply Comments *

Dear Mr. Caton:

Texas Instruments through its RFID Systems Group submitted comments electronically on February 8, 2002 supporting the proposed recommendations regarding Part 2 & 15 changes affecting the 13.56 MHz & 433 MHz frequencies in the NPRM in docket 01-278.

We appreciate the positive support directed toward the Commission's proposed modification of Section 15.225 of the Rules, which would lead to greater international harmonization of 13.56 MHz RFID. Supporters responded from a wide spectrum of companies representing both developers and users of RFID: 3M, DataBrokers, Gap Inc., Magtek, Moba, Motorola, Philips Semiconductors, Savi, Shure Brothers and Texas Instruments. Three organizations representing many companies/industries and individuals have given their endorsements. They are: 1) Consumers Electronics Association (CEA), 2) Telecommunications Industry Association (TIA) and 3) INCITS B10 card committee. Only two comments expressed concerns.

Amateur radio extra class licensee Nickolaus E. Leggett raised a concern about amateur operators conducting planetary observations in the 13.36 – 13.41 MHz astronomy band. When tests at the proposed limit were conducted at one of the world's leading high frequency radio observatories at Nancay, France, the RFID signals from interrogators at the proposed power levels that would fall within the radio astronomy band could not be detected by the very sensitive detecting equipment at the edge of the observatory's property.[1] The physics of passive tags (i.e. beam powered tags) prevent any read ranges longer than about 1.5 meters at the signal levels proposed because of the inherent difficulty of capturing enough electrical energy in the tag to power a transmitter that would emit such a signal or reflect enough energy to get greater range in the case of some modulated backscatter techniques. **[In fact, the field strength from interrogators (i.e. readers) must be measured at less than the specified 30 meter distance during FCC Part 15 certification testing if the energy in the sidebands is to be recorded accurately and the field strength of the signal from the tags is usually far below that of the signal from the reader.]** The energy in the modulation sidebands would, of

[1] These tests were described in a submittal made in connection with RM-9375. See Ex Parte of Texas Instruments, filed February 3, 1999. Only when the equipment that generated the energy in the modulation sidebands was brought near the array could the energy be detected. When the RFID equipment was operated in the observatory parking lot, the signal could not even be detected.

course, be substantially lower than the signal level within the 13.56 MHz +/- 7 kHz band. The revised proposal submitted in RM-9375 was discussed with both the FAA and the National Science Foundation by its proponents well in advance of the issuance of the NPRM. Moreover, the matter was reviewed by the Interdepartment Radio Advisory Committee (IRAC) as the representative of federal spectrum users. NTIA, acting as the secretariat of IRAC, notified the FCC that it did not object to the initiation of the rule making.[2] Accordingly, the Commission should proceed with confidence that the sorts of operations proposed at 13.56 MHz would not lead to the problems suggested by Mr. Leggett.

The second comment expressing concern came from Cubic Corporation and was submitted by Dr. Joe Ravenis. Dr. Ravenis, who then also worked for Cubic, co-signed the original proposal in RM-9375 filed in September of 1998 and the revised proposal submitted in December 1999, which resulted in the recommended rule set forth in the NPRM. Cubic has now urged more study and delay in the development of a revised version of Section 15.225 of the Rules. As one of the developers of shorter range technology approved under the current version of Section 15.225, Cubic appears to be having second thoughts about the proposal. Its concerns must be understood against the competitive backdrop of the RFID industry. Cubic's product (FCC ID# LVCMK5) serves a short read range application in ticketing. No other users in either the ticketing or security industry have voiced any concerns known to Texas Instruments RFID Systems group.

Cubic now claims that interference and other public policy issues are associated with the proposal, yet it sets forth no information in support of its assertions other than vague allusions. Section 7 of the Communications Act, 47 U.S.C. § 157, explicitly states, "It shall be the policy of the United States to encourage the provision of new technologies and services to the public." This provision goes on to provide that "any person (other than the Commission) who opposes a new technology or service proposed to be permitted under this Act shall have the burden to demonstrate that such proposal is inconsistent with the public interest." Allusions to alleged potential problems and criticism of the Commission's language in the expression of its technical judgment in the NPRM simply do not meet that burden.

Additionally, in raising the unsupported specter of interference to other Part 15 devices such as its own tag reader, Cubic cannot deny that it was aware of the efforts of the petitioner in RM-9375. Cubic's device was approved in an application granted on June 6, 1998, about three months before Dr. Ravenis and Mr. Naujokas authorized the original filing in RM-9375, and months after the work that led to the filing was initiated by National Council for Information Technology Standardization Technical Committee

[2] A copy of NTIA's letter of May 4, 2000, in this regard is attached hereto.

B10 (NCITS B10).[3] Every developer of Part 15 equipment must contemplate the environment in which its equipment will operate since no Part 15 device is protected from harmful interference. Nevertheless, these fears are not likely to come to pass. Tag reading systems in the 13.56 MHz band are inherently short range devices, generally dependent on RF induction making use of the radiated magnetic field. Even the highest proposed signal level set forth in the NPRM represents slightly less than a 4 dB field strength increase at 13.56 MHz, where the bulk of the energy is concentrated. Thus, if a problem were likely, it would already be very evident. In this respect, TI is not aware of any interference issues of this sort in Europe, Canada & Australia where higher and less restrictive emissions levels than those set forth in the NPRM were implemented about two years ago. Indeed, Japan, too, is considering a similar change to its regulations through efforts undertaken by a working committee of the Ministry of Public Management, Home Affairs, Posts and Telecommunications.

Cubic also asserts that the revision proposed to Section 15.225 by NCITS B10 assumed that the "transmitter/receiver always talks first and is constantly transmitting." Insofar as TI knows, tag reader systems that have been designed to operate at 13.56 MHz contemplate having the reader communicates first, particularly if the tag is powered by the RF signal transmitted from the reader. However, designs need not necessarily have the reader transmit constantly as Cubic posits. For example, the reader could transmit and then listen. It could be keyed by some form of proximity detector. Nevertheless, the NCITS B10 requested rule change is silent as to whether a "reader talks first" scheme was, in fact, contemplated, although the petition (at .page 2) described a manner of operation that would commonly be thought of as a "reader talks first" approach which is preferred. The Commission's rules must necessarily contemplate multiple implementations of technology. The risk in being overly specific is that the Commission will inadvertently stifle innovation. The risk in not being specific enough is that the Commission will open the door to what some might consider rogue uses under the rules. In weighing the risks in this proceeding, TI urges the Commission to move forward with the goal of fostering innovation and international compatibility, consistent with the cardinal principles of Part 15 that harmful interference to licensed services is to be avoided and that Part 15 devices may not claim protection from harmful interference.

Finally, Cubic asserts that Section 15.205 should apply to emissions outside of the band 13.56 MHz +/- 150 kHz. As detailed in the original petition, the problem with such an approach is that the sidebands from RFID devices, regardless of their signal level, would generally not meet the definition of "spurious" emissions as set forth in Section 2.1 of the FCC Rules. Instead, these emissions would be "modulation products" and thus classified as "out-of-band" emissions, a term that is defined in Section 2.1 of the FCC rules so as to be mutually exclusive with the term "spurious emissions." In other words, the benefits of the proposed change cannot come if the rules provide that only spurious

[3] NCITS B10 was working on the proposal for a change in the rules pertaining to the regulation of 13.56 MHz RFID from early in 1998 on through the September 1998 filing of the petition for rule making.

emissions are allowed outside of 13.56 MHz +/- 150 kHz. Thus, adoption of Cubic's proposal would undercut any progress that otherwise might come from a change in the emission limits.

* * *

Like many other RFID developers, TI participated in the work of the petitioner in RM-9375. The NPRM was issued over three years after the petition was filed and after a full round of comments and replies on the petition. Meanwhile, other nations have moved forward with changes to their regulations. The United States need not have identical rules to those in place in Canada, Europe, and Australia. However, the U.S. should have rules for RFID that at least ensure a high measure of international compatibility if this country is to enjoy the benefits of technologies that can provide an additional measure of utility in a wide variety of applications that can make our work more efficient and our lives safer. Accordingly, we urge the Commission to move forward in adopting a report and order flowing from this NPRM as whole and especially a new rule flowing from paragraph 21 of the NPRM (section 15.225) pertaining to operation at 13.56 MHz. Should you have any questions regarding the matters addressed herein, please do not hesitate to contact me at (214) 567-2523 (r-roebuck@ti.com).

Respectfully submitted,

By:

Randal D. Roebuck
Strategic Marketing, Standards & Regulations

Enclosures:

- May 2000's U.S. Department of Commerce NTIA Letter regarding RM-9375 from William Hatch.
- 21 December 1999's B10 RM-9375 Petition Revision from Joseph Naujokas & Dr. Joseph Ravenis.

UNITED STATES DEPARTMENT OF COMMERCE
National Telecommunications and
Information Administration
Washington, D.C. 20230

MAY 24 2000

Mr. Dale Hatfield
Chief, Office of Engineering and Technology
Federal Communications Commission
Washington, DC 20554

Dear Mr. Hatfield:

With assistance from the Interdepartment Radio Advisory Committee (IRAC), we have completed our review of the National Council for Information Technology Standardization Technical Committee B10's and B10.5's petition to revise certain portions of Section 15.225 of the Federal Communications Commission's rules. We understand that the purpose of this petition is to establish an emissions mask which will allow higher speed RF identification operations at 13.56 MHz in a manner that will be compatible with similar operations in Australia and Europe.

Having now completed our review, NTIA has no objection to the FCC initiating the rulemaking sought by the petitioner, provided the emissions mask proposed in the December 21, 1999, letter to Ms. Magalie Roman Salas from Joseph A. Naujokas and Dr. Joseph VJ Ravenis II is the basis for such a rulemaking.

Sincerely,

William T. Hatch
Associate Administrator
Office of Spectrum Management

Enclosure

December 21, 1999

Ms. Magalie Roman Salas
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: RM-9375

Dear Ms. Salas:

As the petitioners in the above-referenced Petition for Rule Making, this is to request that the Commission issue a notice of proposed rule making that calls for amendment of Section 15.225 of the Commission's Rules in the manner set forth in the revised version of this rule section enclosed with this letter instead of the version set forth in the petition as originally filed on September 10, 1998.

After the Petition was filed, the Commission sought comment from interested parties and discussed the original proposal with the Interdepartmental Radio Advisory Committee (IRAC). Although the goal of the petition to facilitate the international deployment of radio frequency identification devices operating at 13.56 MHz received widespread support, certain IRAC members voiced concern that the proposal as drafted could result in increased signal levels for Part 15 intentional radiators throughout the high frequency spectrum and even above. These concerns led to discussions between a member of the petitioners and government spectrum managers as to ways in which the objectives of the original petition might be met without the potential increase in noise throughout the HF spectrum. As a result of these discussions, the proposal has been modified to allow for the benefits of enhanced radio identification technology operating at 13.56 MHz to flow to the public without potentially opening up most of the HF spectrum or above to increased noise.

Under the revised language attached hereto, the rules would set forth an emissions mask that would allow for higher speed RF identification operations at 13.56 MHz in a manner that would be compatible with -- though not identical to -- the European and the Australian standards governing similar operations at 13.56 MHz. Accordingly, having voted to amend the proposal to reflect this emissions mask, we now urge the Commission to move forward with the issuance of a notice of proposed rule making calling for the amendment of Section 15.225 in the manner set forth in the attachments to this letter.

Respectfully submitted,

NATIONAL COUNCIL FOR INFORMATION TECHNOLOGY STANDARDIZATION * TECHNICAL COMMITTEE B10, IDENTIFICATION CARDS AND RELATED DEVICES.

*Accredited by American National Standards Institute

By: /s/ Joseph A. Naujokas

Joseph A. Naujokas
Chair, NCITS B10
3916 Esgarth Way
Owings Mills, MD 21117
Phone: 410-581-3537
Email: JA_Naujokas@compuserve.com

NATIONAL COUNCIL FOR INFORMATION TECHNOLOGY STANDARDIZATION * TECHNICAL COMMITTEE B10.5, IDENTIFICATION CARDS AND RELATED DEVICES, CONTACTLESS IC CARDS.

By: /s/ Joseph VJ Ravenis II

Dr. Joseph VJ Ravenis II
Chair, NCITS B10.5
9333 Balboa Avenue
San Diego, CA 92123
Phone: 858-627-4654
Email: joe.ravenis@cubic.com

December 21, 1999

Revised Proposed Section 15.225 of the Rules

(Underlining shows changes from the current text of 47 C.F.R. § 15.225 (1998.)

§15.225 Operation within the band 13.553-13.567 MHz.

Operations within the band 13.553 – 13.567 MHz are subject to the following conditions:

(a) The field strength of any emissions within this band shall not exceed 15,848 microvolts/meter at 30 meters (*i.e.*, 84 dBuV/m at 30 meters or 32.5 dBuA/m at 30 meters in the case of magnetic field measurements).

(b) Within the band 13.410 - 13.710 MHz, the field strength of any emissions appearing outside of the band 13.553 – 13.567 MHz shall not exceed 334 microvolts/meter at 30 meters (*i.e.*, 50.5 dBuV/m at 30 meters or -1 dBuA/m at 30 meters in the case of magnetic field measurements).

(c) Within the bands 13.110 – 13.410 MHz and 13.710 – 14.010 MHz, the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters (*i.e.*, 40.5 dB uV/m at 30 meters or –11 dB uA/m at 30 meters in the case of magnetic field measurements).

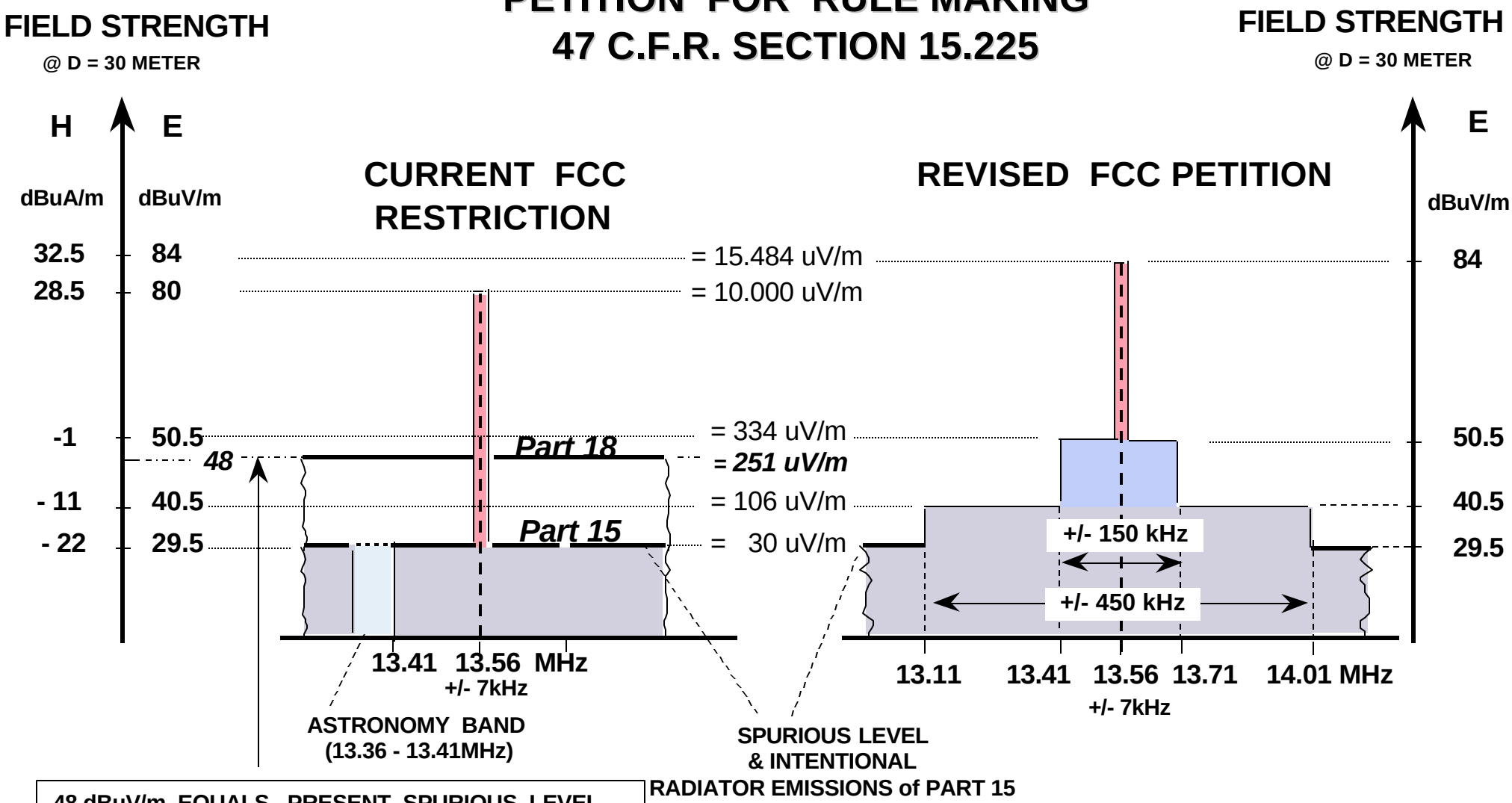
(d) The field strength of any emissions appearing outside of the band 13.110 – 14.010 MHz shall not exceed 30 microvolts/meter at 30 meters (*i.e.*, 29.5 dBuV/m at 30 meters or -22 dBuA/m at 30 meters in the case of magnetic field measurements).

(e) The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

(f) In the case of radio frequency powered tags designed to operate with a device authorized under this section, the tag shall, at the option of the applicant for equipment authorization, be approved with the device or be considered as a separate device subject to its own authorization.

SOURCE: ANSI NCITS, B 10.5	**PURPOSE:** International Harmonization of Radio
REFER.: ISO/IEC JTC1/SC17/WG8/TF2,TF3 ISO14443, 15693	Regulations for the 13.56 MHz Band

Attachment 1, Rev.1, Nov.1999
PETITION FOR RULE MAKING
47 C.F.R. SECTION 15.225



48 dBuV/m EQUALS PRESENT SPURIOUS LEVEL OF SECTION 18.305(b): 25uV/m @ d=300m AS CALCULATED TO 30m WITH 20dB/DECADE ROLL-OFF